

Claims

1. Electromotive furniture actuator for adjusting portions of a piece of furniture relative to each other,

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having two electromotively driven adjusting units, each of which is, in the assembled position of the furniture actuator, functionally connected to a portion of the piece of furniture to be adjusted for adjusting the same,

10 **characterized by**

a mutual drive motor (24) for driving the adjusting units (4; 6) and

coupling means which are moveable between a first position and a second position and couple the drive motor (24), in the first position, to the first adjusting unit (4) and, in the second position, to the second adjusting unit (6), and thus to bring them into driving connection with the respective adjusting unit (4; 6).

2. Furniture actuator according to claim 1, **characterized in that** the adjusting units (4; 6)

20 each have an actuating element to be driven to rotate, the drive motor (24), in a first position of the coupling means, being in rotary driving connection with the actuating element of the first adjusting unit (4) and, in a second position of the coupling means, with the actuating element of the second adjusting unit (6).

25 3. Furniture actuator according to claim 2, **characterized in that** the actuating element to be driven to rotate is part of a spindle drive (20, 22; 20', 22') which has a linearly moveable adjusting element being functionally connected, in the assembled position of the furniture actuator (2), with a portion of the piece of furniture to be adjusted.

30 4. Furniture actuator according to claim 3, **characterized in that** the actuating element is a stationary spindle (20; 20') mounted to be driven to rotate, on which a spindle nut (22; 22') is arranged in a torque proof manner and moveable in the axial direction, which forms the adjusting element or is connected to the adjusting element.

5. Furniture actuator according to claim 3, **characterized in that** the actuating element is a stationary spindle nut mounted to be rotated and arranged on a spindle which is moveable in the axial direction, torque proof and forms the adjusting element or is connected to the adjusting element.

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6. Furniture actuator according to claim 3, **characterized in that** the linearly moveable element is in functional connection with a pivotably mounted shaft (10; 16) for pivoting the same in the assembled position of the furniture actuator, wherein the shaft (10; 16) is in functional connection with a portion of the piece of furniture to be adjusted.

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7. Furniture actuator according to claim 6, **characterized in that** a pivot lever (12; 18) is connected to the shaft (10; 16) in a torque proof manner, which lever is pivotable by means of the linearly moveable adjusting element.

15 8. Furniture actuator according to claim 2, **characterized in that** the coupling means have a clutching arrangement which, in a first clutching-in position clutches-in the actuating element of the first adjusting unit (4), and, in a second clutching-in position, clutches-in the actuating element of the second adjusting unit (6) to the drive motor (24), and thus brings the drive motor (24) into a rotary drive connection with the respective actuating element.

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9. Furniture actuator according to claim 8, **characterized in that** the clutching arrangement has a third clutching-in position in which the actuating element of the first adjusting unit (4) as well as the actuating element of the second adjusting unit (6) are clutched-in to the drive motor (24).

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10. Furniture actuator according to claim 8, **characterized in that** the clutching arrangement has a fourth clutching position in which the actuating element of the first adjusting unit (4) as well as the actuating element of the second adjusting unit (6) are de-coupled from the drive motor (24).

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11. Furniture actuator according to claim 8, **characterized in that** the clutching arrangement has at least one clutch coupling or shifting coupling clutch (28).

12. Furniture actuator according to claim 11, **characterized in that** the coupling clutch (28) is a shifting clutch with positive engagement.
13. Furniture actuator according to claim 1, **characterized in that** the coupling clutch (28) has a clutching element (30) on the pinion end side which is in rotary driving connection with the drive motor (24), and that the rotatably driveable actuating elements of the adjusting units (4; 6) are each associated with a power take-off side clutching element (32; 32'), wherein the power take-off side clutching elements (32; 32') can be brought into engagement with the pinion end clutching element (30) in order to clutch-in the respective adjusting unit (4; 6) to the drive motor (24).
14. Furniture actuator according to claim 13, **characterized in that** the power take-off side clutching element (32; 32') associated with an adjusting unit (4; 6) is connected with the actuating element of this adjusting unit (4; 6) in a torque proof manner.
15. Furniture actuator according to claim 13, **characterized in that** the power take-off side clutching element (32; 32') associated with an adjusting unit (4; 6) is in rotary drive connection with the actuating element of this adjusting unit (4; 6) via a gearing arrangement.
16. Furniture actuator according to claim 15, **characterized in that** the power take-off side clutching element (32; 32') is designed as a toothed wheel or is connected to a toothed wheel in a torque proof manner, which toothed wheel engages a toothed wheel (62; 62') connected to the actuating element in a torque proof manner.
17. Furniture actuator according to claim 16, **characterized in that** the toothed gears (62; 62') are spur-toothed wheels.
18. Furniture actuator according to claim 13, **characterized in that** the pinion side clutching element (30) is designed as a worm wheel or connected to a worm wheel in a torque proof manner, which worm wheel is in engagement with a worm (26) connected to the power take-off shaft of the drive motor.

19. Furniture actuator according to claim 13, **characterized in that** the pinion side clutching element (32) and/or at least one of the power take-off side clutching elements (32; 32') is mounted in an axially moveable manner such that by axial movement of the pinion side clutching element (30) and/or at least one of the power take-off side clutching elements (32; 32') the power take-off side clutching elements (32; 32') can be brought out of and in engagement, respectively, with the pinion side clutching element.
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20. Furniture actuator according to claim 19, **characterized in that** the power take-off side clutching elements (32; 32') are arranged in a stationary manner and that the pinion side clutching element (30) is arranged in the axial direction between the power take-off side clutching elements (32; 32') and axially moveable.
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21. Furniture actuator according to claim 19, **characterized in that** the pinion side clutching element (30) is arranged in a stationary manner and that at least one of the power take-off side clutching elements (32; 32') is axially moveable.
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22. Furniture actuator according to claim 21, **characterized in that** the power take-off side clutching elements (32; 32') are axially moveable separate from each other.
- 20 23. Furniture actuator according to claim 21, **characterized in that** the power take-off side clutching elements (32; 32') are axially moveable together.
24. Furniture actuator according to claim 23, **characterized in that** the power take-off side clutching elements (32; 32') are mounted at a fixed distance to each other on an axially moveable axle (64), wherein the axial distance of the clutching elements (32; 32') with regard to each other is selected such that in a first position of the axle (64) the power take-off side clutching element (32) of the first adjusting unit (4) is in engagement with the pinion side clutching element (30) and the power take-off side clutching element (32') of the second adjusting unit (6) is out of engagement of the pinion side clutching element (30), whereas in a second position of the axle (64) the power take-off side clutching element (32') of the second adjusting unit (6) is in engagement with the pinion side clutching element (30) and the power take-off side clutching element (32) of the first adjusting unit is out of engagement of the pinion side clutching element (30).
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25. Furniture actuator according to claim 21, **characterized in that** one further clutching element (104; 104'), associated with at least one adjusting unit (4; 6), preferably at least one further clutching element associated with both adjusting units, is provided, which further clutching element is arranged, when seen in the axial direction, on the side opposite the pinion side clutching element (30) of the power take-off side clutching element (32; 32') of this adjusting unit (4; 6) and is in rotary drive connection with the actuating element of this adjusting unit (4; 6) such that by axial movement of the clutching element (32; 32') the further clutching element (104; 104'), and thus the actuating element, can be clutched-in with the pinion side clutching element (30) or be de-coupled therefrom.
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26. Furniture actuator according to claim 25, **characterized in that** the power take-off side clutching elements (32; 32') of the adjusting units (4; 6) have axial protrusions (106, 108) on both their axial sides, each, via which protrusions they engage complementarily-shaped recesses (110, 112) in the respective clutching position, which recesses are formed at the pinion side clutching element's (30) side facing the respective power take-off side clutching element (32; 32'), and that of the further clutching element (104; 104').
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27. Furniture actuator according to claim 13 or 25, **characterized in that** the pinion side clutching element (30) and the power take-off side clutching elements (32; 32') and, if necessary, the further clutching element (104; 104') are mounted in a co-axial manner.
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28. Furniture actuator according to claim 21, **characterized in that** the drive motor (24) is arranged to be stationary.
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29. Furniture actuator according to claim 21, **characterized in that** the pinion side clutching element (30) is arranged on moveable support means (86) together with the drive motor (24) such that the pinion side clutching element (30) can be moved together with the drive motor (24).
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30. Furniture actuator according to claim 29, **characterized in that** the support means (86) can be displaced in the axial direction of the pinion side clutching element (30).

31. Furniture actuator according to claim 19, **characterized by** spring means for biasing the moveable clutching element (30; 32; 32') or at least one of the moveable clutching elements (30; 32; 32') into a start position.
- 5 32. Furniture actuator according to claim 19, **characterized by** activating means for moving the moveably mounted clutching elements (30; 32; 32').
- 10 33. Furniture actuator according to claim 2, **characterized in that** the drive motor (24) is capable of being brought into rotary drive connection with the actuating elements of the adjusting units (4; 6) via a gearing arrangement (116).
- 15 34. Furniture actuator according to claim 33, **characterized in that** the coupling means have a moveable support means (114) in which at least one gear element (118, 120, 122) of the gearing arrangement (116) is mounted, wherein the support means (14) is moveable between a first position, in which the gearing arrangement (116) brings about the rotary drive connection of the actuating element of the first adjusting unit (4) with the drive motor (24), and a second position, in which the gearing arrangement (116) brings about the rotary drive connection of the actuating element of the second adjusting unit (6) with the drive motor (24).
- 20 35. Furniture actuator according to claim 34, **characterized in that** the support means (114) is linearly displaceable.
- 25 36. Furniture actuator according to claim 34, **characterized in that** the support means (114) is rotatable or tiltable.
- 30 37. Furniture actuator according to claim 35, **characterized in that** the gearing arrangement (116) has a first and a second toothed wheel (118, 120) which are mounted in a torque proof manner on a mutual shaft driven to rotate by the drive motor (24), and that a third gear wheel (124) and a fourth gear wheel (124') are associated with the actuating element of the first adjusting unit (4) and the actuating element of the second adjusting unit (6), respectively, wherein the support means (114) is moveable relative to the third and fourth gear wheels (124; 124') such that in the first position of the support means (114) the first gear wheel (118) engages the third gear wheel (124), whereas the second

gear wheel (120) is out of engagement of the fourth gear wheel (124'), and that in the second position of the supporting means (114) the second gear wheel (120) engages the fourth gear wheel (124'), while the first gear wheel (118) is out of engagement of the third gear wheel (124).

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38. Furniture actuator according to claim 35 and 37, **characterized in that** the first and the second gear wheels are bevel wheels (130, 132).

39. Furniture actuator according to claim 38, **characterized in that** the support means

10 (114) is rotatable in the radius about the take-off shaft of the drive motor (24).

40. Furniture actuator according to claim 37, **characterized in that** the drive motor (24) is arranged on the support means (114) in a manner that the gearing arrangement (116) is moveable together with the drive motor (24).

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41. Furniture actuator according to claim 34, **characterized by** spring means for biasing the support means (114) into a starting position.

42. Furniture actuator according to claim 34, **characterized by** actuating means for moving the support means.

20 43. Furniture actuator according to claim 32 or 42, **characterized in that** the actuating means are mechanical actuating means.

25 44. Furniture actuator according to claim 43, **characterized in that** the mechanical actuating means have pulling means which can be operated manually.

45. Furniture actuator according to claim 32 or 42, **characterized in that** the actuating means are electromechanical actuating means.

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46. Furniture actuator according to claim 44, **characterized in that** the electromechanical actuating means have at least one electromagnet (56).

47. Furniture actuator according to claim 44, **characterized in that** the electromechanical actuating means have at least one servo motor.
48. Furniture actuator according to claim 32 or 42, **characterized by** at least one two-armed lever (42) whose one lever arm (44) is functionally connected to the moveable component and whose other lever arm (46) is functionally connected to the actuating means.
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49. Furniture actuator according to claim 1, **characterized by** switching means for switching the drive motor on and off.
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50. Furniture actuator according to claim 3, **characterized in that** the spindle drive is self-locking.
51. Furniture actuator according to claim 3, **characterized in that** the spindle drive (20, 22; 15 20', 22') is non-self-locking.
52. Furniture actuator according to claim 1, **characterized by** controlling means for controlling the direction of rotation of the drive motor.